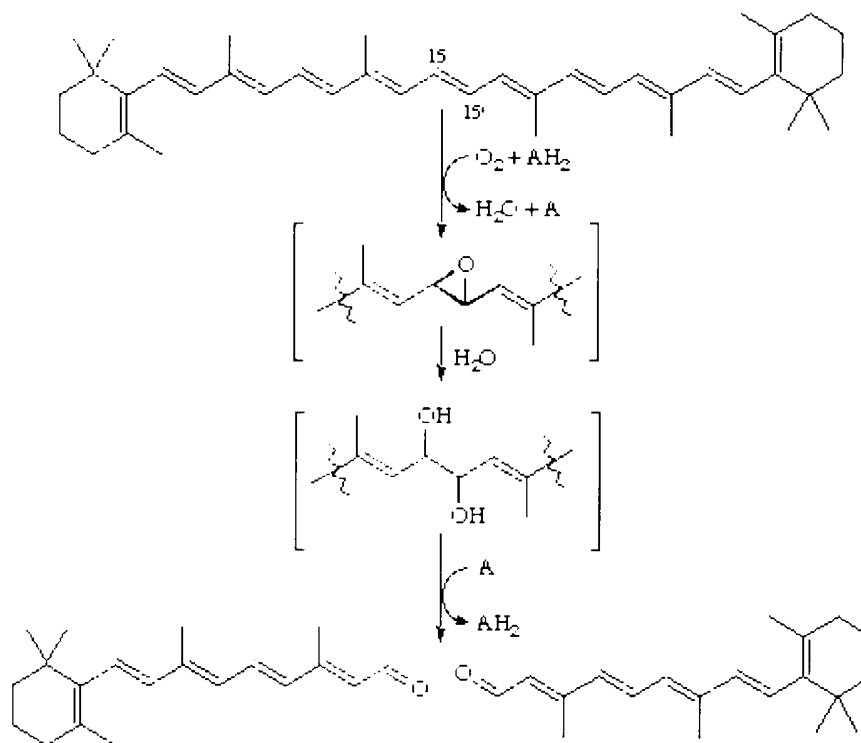


EC 1.14.99.36 **β -carotene 15,15'-monooxygenase**

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[EC 1.14.99.36 \$\beta\$ -carotene 15,15'-monooxygenase](#)

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ENTRY EC [1.13.11.21](#) Obsolete
NAME Transferred to [1.14.99.38](#)
CLASS Oxidoreductases
 Acting on single donors with incorporation of molecular oxygen
 (oxygenases)
 With incorporation of two atoms of oxygen
COMMENT Transferred entry: now EC [1.14.99.38](#), beta-carotene
 15,15'-monooxygenase (EC [1.13.11.21](#) created 1972, deleted 2001)
DELINKS IUBMB Enzyme Nomenclature: [1.13.11.21](#)
 ExpASY - ENZYME nomenclature database: [1.13.11.21](#)
 WIT (What Is There) Metabolic Reconstruction: [1.13.11.21](#)
 BRENDA, the Enzyme Database: [1.13.11.21](#)

[[KEGG](#) | [DBGET](#) | [GenomeNet](#)]

[LinkDB]

ENTRY [EC 1.14.99.36](#)
NAME [beta-carotene 15,15'-monooxygenase](#)
[beta-carotene 15,15'-dioxygenase](#), [carotene dioxygenase](#)
[carotene 15,15'-dioxygenase](#)
CLASS [oxidoreductases](#)
Acting on paired donors with incorporation of molecular oxygen
Miscellaneous
SYSNAME [beta-carotene: oxygen 15,15'-oxidoreductase \(bond-cleaving\)](#)
REACTION [beta-carotene + O2 = 2 retinal](#)
SUBSTRATE [beta-carotene](#)
PRODUCT [retinal](#)
COMMENT Requires bile salts and Fe(II). The reaction proceeds in three stages, epoxidation of the 15,15'-double bond, hydration of the double bond leading to ring opening, and oxidative cleavage of the ring formed (cf. [EC 1.14.15.4](#), cholesterol monooxygenase [side-chain-cleaving]). Thus only one atom of the dioxygen is incorporated into retinal. Formerly [EC 1.11.11.1](#) as it was considered to be a dioxygenase.
REFERENCE 1
Lewandowicz, M.S., Engeloch-Barret, C. and Woggon, W.D. The reaction mechanism of the enzyme-catalysed central cleavage of beta-carotene to retinal. *Angew. Chem. Int. Ed.* 40 (2001) 2614-2616.
2
Goodman, D.S., Huang, H.S., Menai, M. and Shiratori, T. The enzymatic conversion of all-trans beta-carotene into retinal. *J. Biol. Chem.* 242 (1967) 3643-3654.
3 [PMID: 347773]
Goodman, D.S., Huang, H.S. and Shiratori, T. Mechanism of the biosynthesis of vitamin A from beta-carotene. *J. Biol. Chem.* 241 (1966) 1319-1322.
PATHWAY PATH: [K00031](#) Retinol metabolism
ORTHOLOG NO: [K00315](#) beta-carotene 15,15'-monooxygenase
GENES ECA: [b0630](#) (ECDC)
MCH: [b0857](#) (Bodo)
ENO: [b14105](#) (Bodo)
DEE: [b1030](#) (Bodo)
DISEASE MIM: [115748](#) Beta-carotene 15,15'-prime-dioxygenase
DOLINKS IUBMP Enzyme Nomenclature: [1.14.99.36](#)
ExPASy - ENZYME nomenclature database: [1.14.99.36](#)
WIT (What Is There) Metabolic Reconstruction: [1.14.99.36](#)
BRENDA, the Enzyme Database: [1.14.99.36](#)
CAS: 37250-60-3

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[LinkDB]

ENTRY EC 1.14.99.36
 NAME beta-carotene 15,15'-monooxygenase
 beta-carotene 15,15'-dioxygenase, carotene dioxygenase
 carotene 15,15'-dioxygenase
 CLASS Oxidoreductases
 Acting on paired donors with incorporation of molecular oxygen
 Miscellaneous
 SYSNAME beta-carotene:oxygen 15,15'-oxidoreductase (bond-cleaving)
 REACTION beta-carotene + O2 = 2 retinal
 SUBSTRATE beta-carotene
 PRODUCT retinal
 COMMENT Requires bile salts and Fe(II). The reaction proceeds in three stages, epoxidation of the 15,15'-double bond, hydration of the double bond leading to ring opening, and oxidative cleavage of the diol formed [cf. EC 1.14.15.6, cholesterol monooxygenase (side-chain-cleaving)]. Thus only one atom of the dioxygen is incorporated into retinal. Formerly EC 1.14.11.1 as it was considered to be a dioxygenase.
 REFERENCE 1
 Ledwenger, M.G., Engeloch-Jarret, C. and Woygen, W.D. The reaction mechanism of the enzyme-catalysed central cleavage of beta-carotene to retinal. *Angew. Chem. Int. Ed.* 40 (2001) 2614-2616.
 2
 Goodman, L.S., Huang, H.S., Wanai, M. and Shiratori, T. The enzymatic conversion of all-trans beta-carotene into retinal. *J. Biol. Chem.* 242 (1967) 3843-3854.
 3 [PMID: 6460131]
 Goodman, L.S., Huang, H.S. and Shiratori, T. Mechanism of the biosynthesis of vitamin A from beta-carotene. *J. Biol. Chem.* 241 (1966) 1409-1412.
 PATHWAY PATH: [MAP0201](#) Retinol metabolism
 ORTHOLOG EC: [P1251](#) beta-carotene 15,15'-monooxygenase
 GENES ECA: [13636](#) (HOLCO)
 MMT: [1381](#) (Bodo)
 RNO: [114106](#) Bodo
 LPE: [1403](#) (Bodo)
 DISEASE MIM: [105146](#) beta-carotene 15,15'-prime-dioxygenase
 DBLINKS TrEMBL Enzyme Nomenclature: [1.14.99.36](#)
 ExPASy - ENZYME nomenclature database: [1.14.99.36](#)
 WIT What Is There? Metabolic Reconstruction: [1.14.99.36](#)
 ERENDA, the Enzyme Database: [1.14.99.36](#)
 CAS: 77256-80-3

[KEGG | DBGET | GenomeNet]